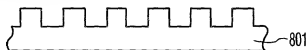
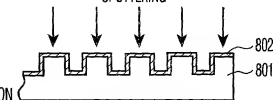


FIG. 3

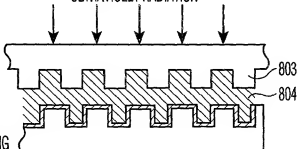
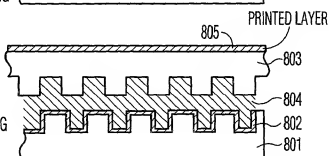
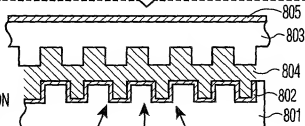
FIRST DISK FABRICATION PROCESS

STEP (1)
FORMING

SPUTTERING

STEP (2)
REFLECTIVE
FILM FORMATION

ULTRAVIOLET RADIATION

STEP (3)
LAMINATION
AND HARDENINGSTEP (4)
LABEL PRINTINGSECONDARY
RECORDING
PROCESSSTEP (5)
FORMATION
OF FIRST
OPTICAL
MARK

PULSED LASER 813

①

FIG. 4

5/51

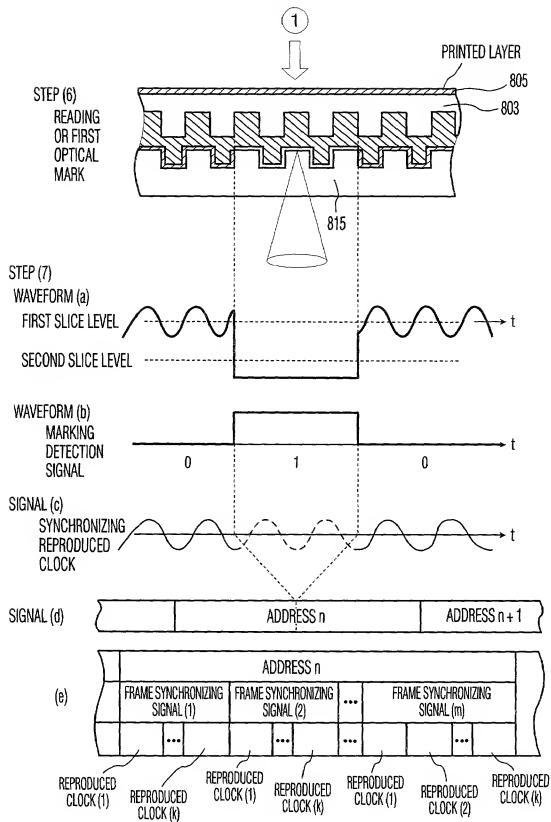
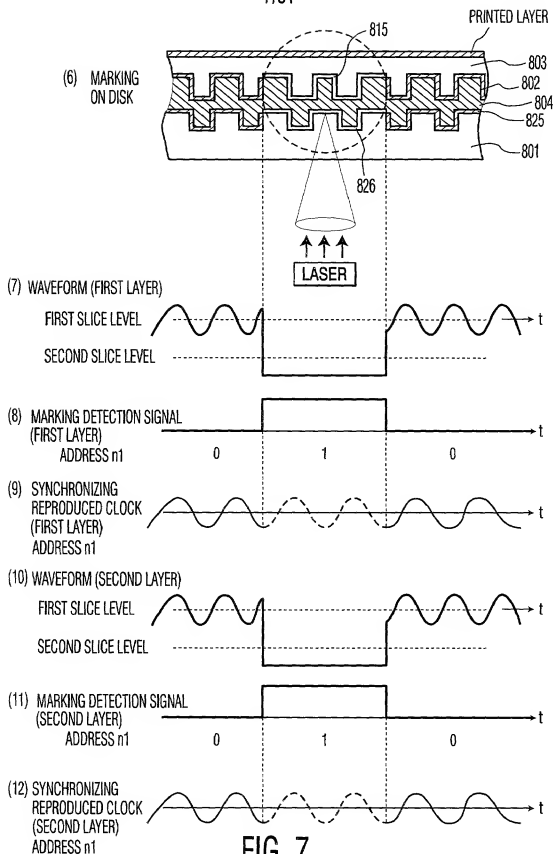


FIG. 5





8/51

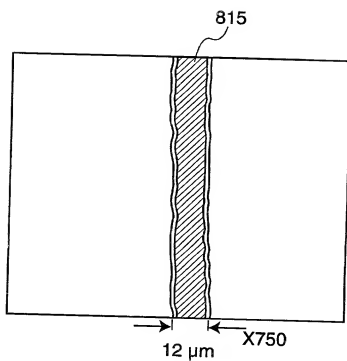


FIG. 8A

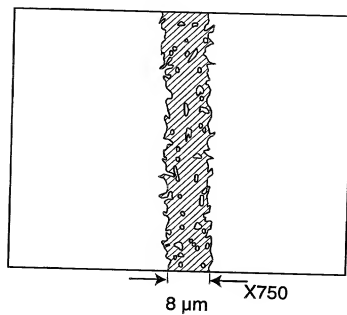


FIG. 8B

FIG. 9A

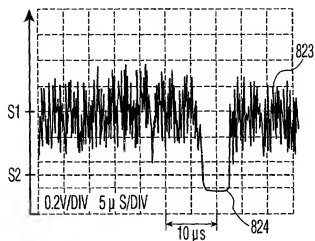


FIG. 9B

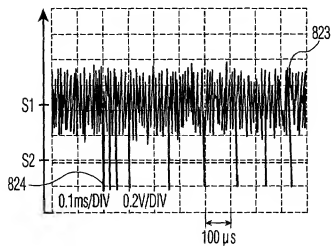


FIG. 9C

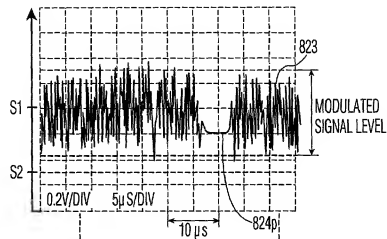
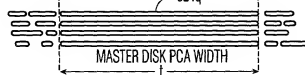
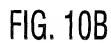
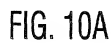


FIG. 9D





11/51

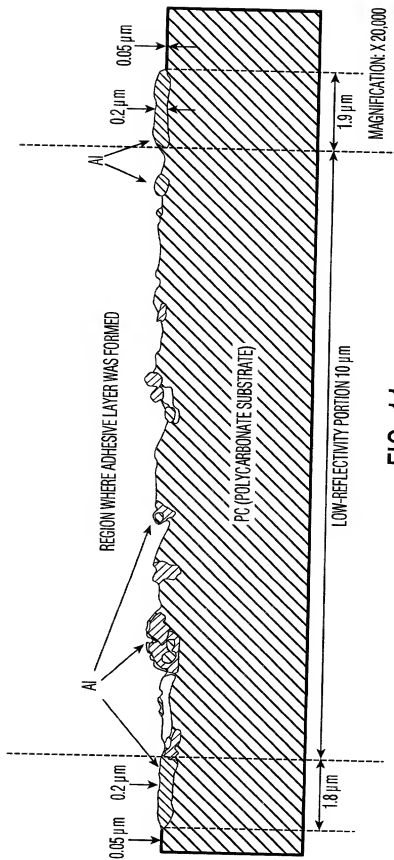


FIG. 11

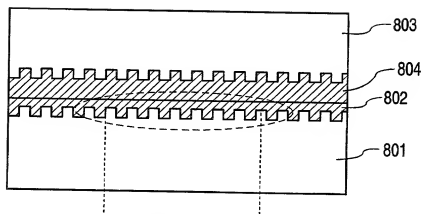


FIG. 12A

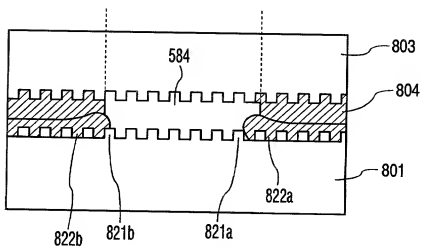


FIG. 12B

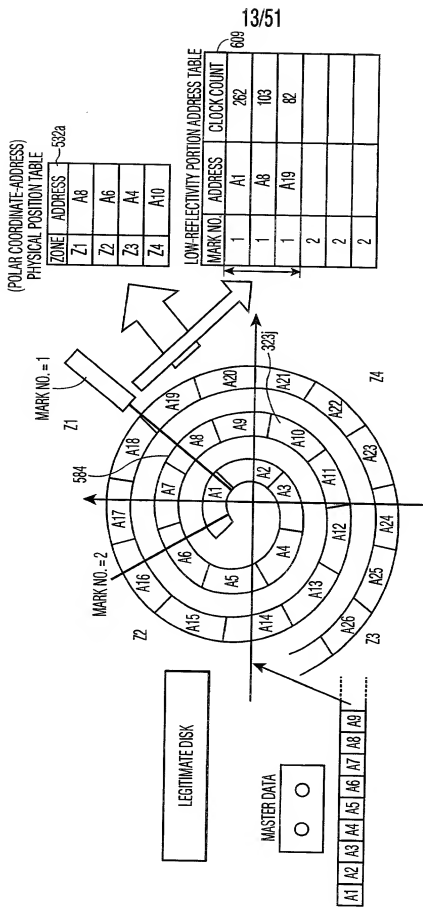
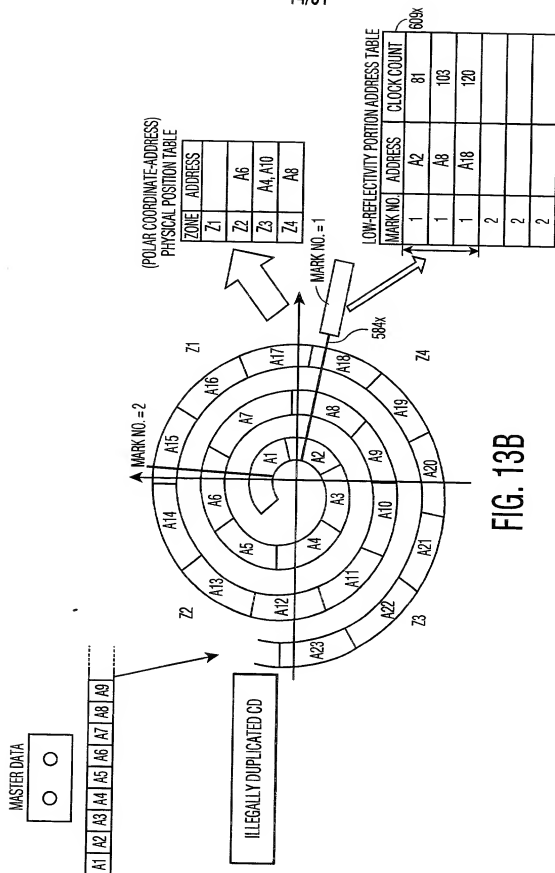


FIG. 13A



15/51

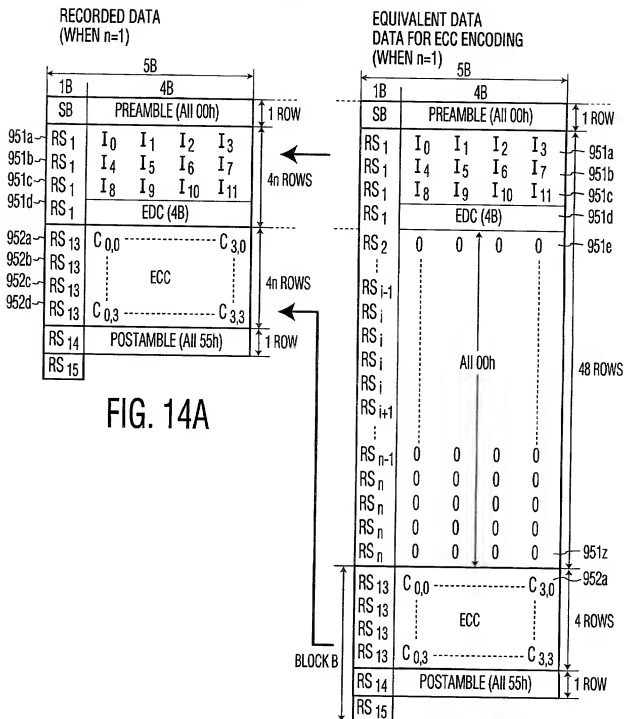
FIG. 14A

FIG. 14B

FIG. 14C

FIG. 14D

FIG. 14



TYPICAL EQUATION
FOR EDC COMPUTATION
EDC (ERROR DETECTION CODE) :

$$EDC_{PCA}(x) = \sum_{i=0}^{31} b_i \cdot x^i$$

$$I_{PCA}(x) = \sum_{i=32}^{128n-31} b_i \cdot x^i$$

FIG. 14C

TYPICAL EQUATION
FOR EDC COMPUTATION
ECC (ERROR CORRECTION CODE) :

$$R_{PCA}(x) = \sum_{i=48}^{51} I_{j+4i} \cdot x^{51-i}$$

$$I_{PCA}(x) = \sum_{i=0}^{4n-2} I_{j+4i} \cdot x^{51-i} + D_j \cdot x^{52-4n},$$

FIG. 14D

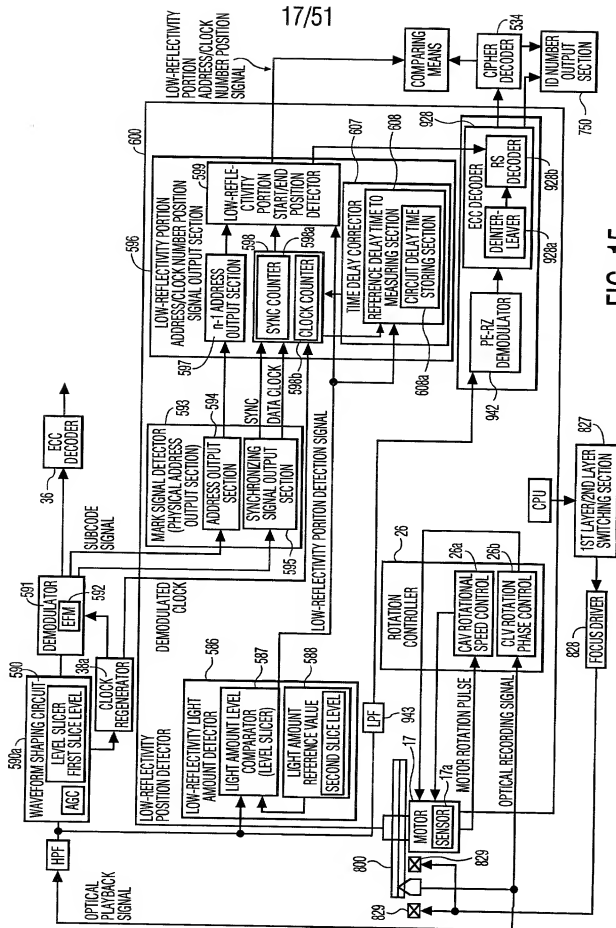


FIG. 15



19/51

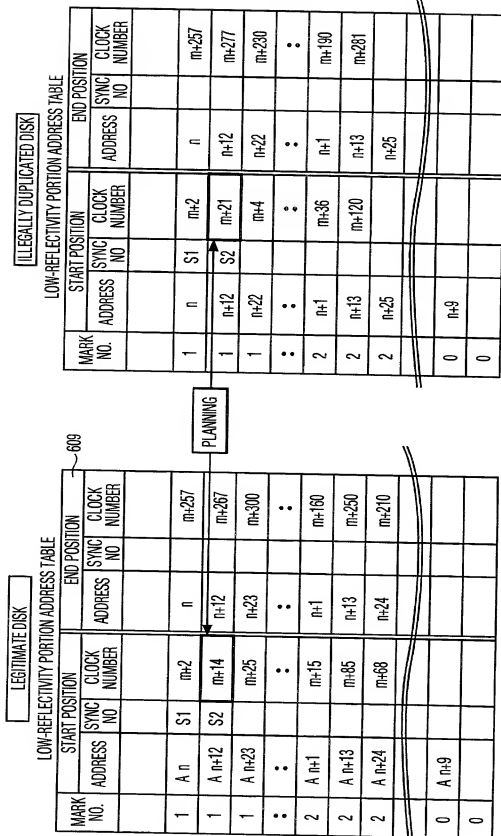
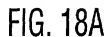


FIG. 17



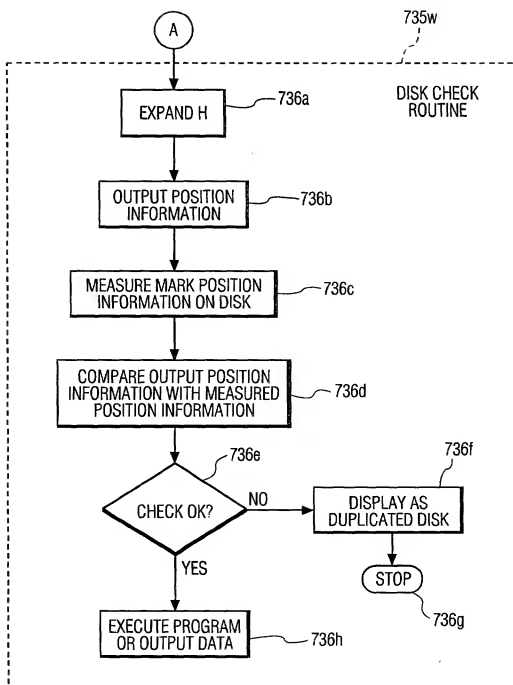


FIG. 18B

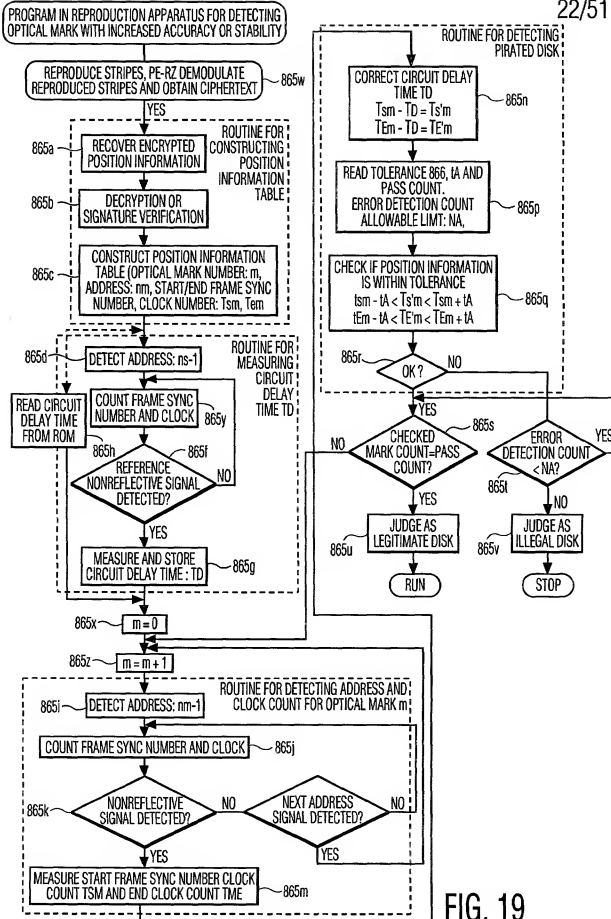


FIG. 19

FIRST LAYER MARKING SIGNAL DETECTION WAVEFORM

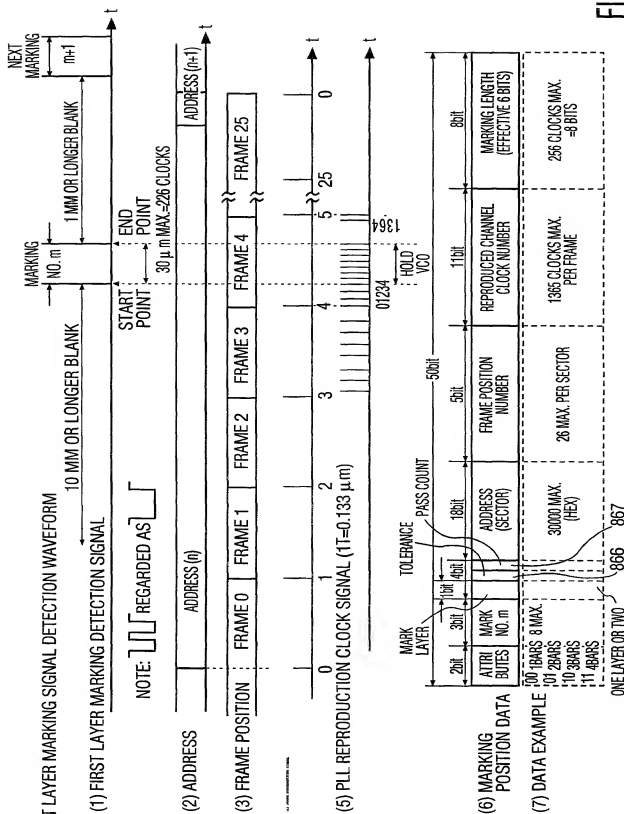
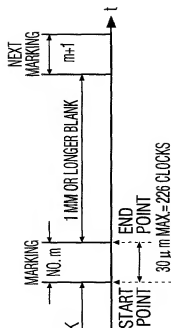


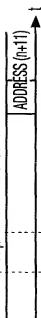
FIG. 20

SECOND LAYER MARKING SIGNAL DETECTION WAVEFORM

(1) SECOND LAYER MARKING DETECTION SIGNAL

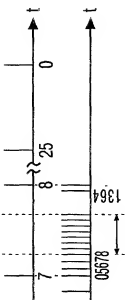
NOTE:  REGARDED AS 

(2) SECOND ADDRESS ADDRESS (n+10)



(3) FRAME POSITION FRAME 0 FRAME 1 FRAME 2 FRAME 8 FRAME 9 FRAME 25

(4) FRAME SYNCHRONIZING SIGNAL



(5) PLL REPRODUCTION CLOCK SIGNAL (1T=0.133 μm)

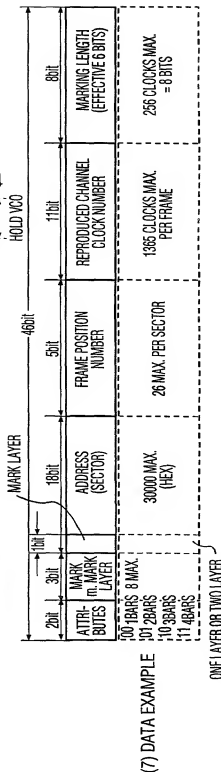


FIG. 21

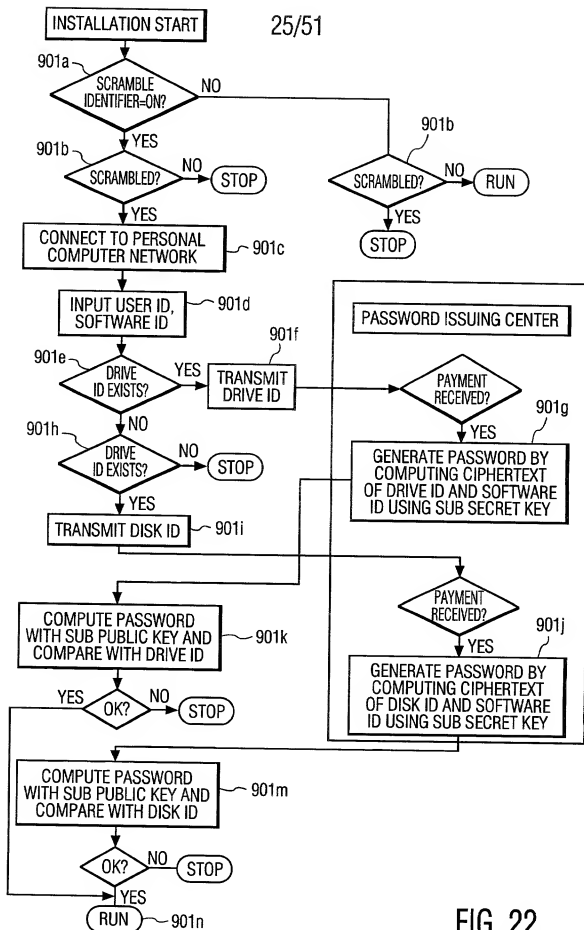


FIG. 22

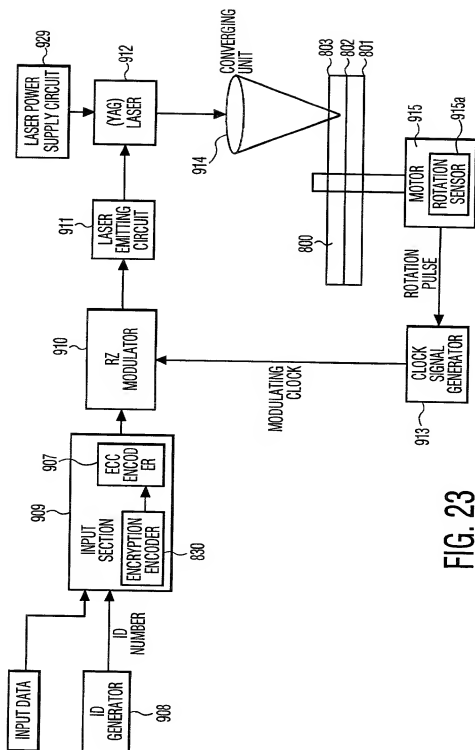


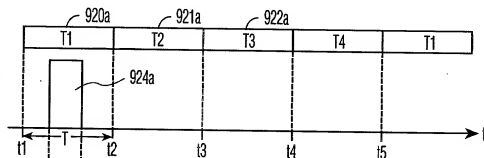
FIG. 23

RZ RECORDING
MODULATION CLOCK
BASED ON ROTATION
PULSE

FIG. 24A

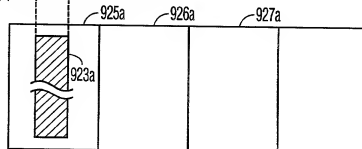
(1) RECORDED SIGNAL OF "00"

FIG. 24B



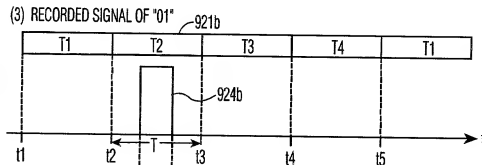
(2) TRIMMING PATTERN OF "00"

FIG. 24C



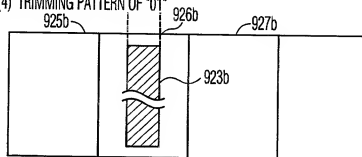
(3) RECORDED SIGNAL OF "01"

FIG. 24D



(4) TRIMMING PATTERN OF "01"

FIG. 24E



28/51

(1) RECORDED SIGNAL OF "00"

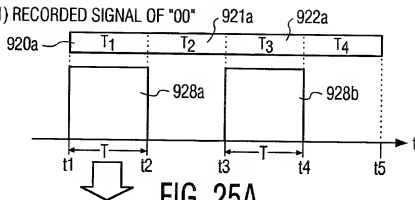


FIG. 25A

(2) TRIMMING PATTERN OF "00"

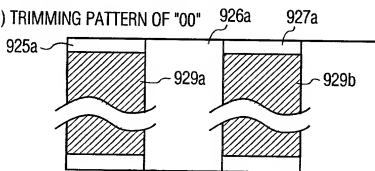


FIG. 25B

(3) RECORDING SIGNAL OF "10"

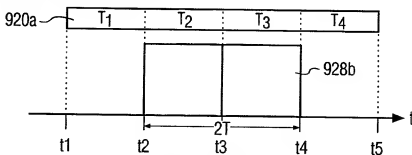


FIG. 25C

(4) TRIMMING PATTERN OF "10"

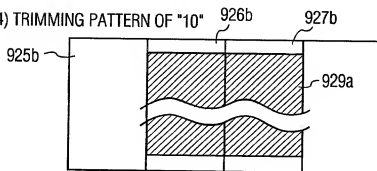
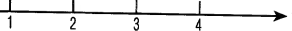


FIG. 25D

PE-RZ RECORDING

RECORDING

CLOCK



(1) RECORDED SIGNAL OF "0"

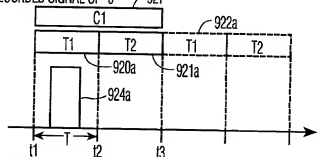


FIG. 26A

(2) TRIMMING PATTERN OF "0"

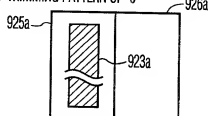


FIG. 26B

(3) RECORDED SIGNAL OF "1"

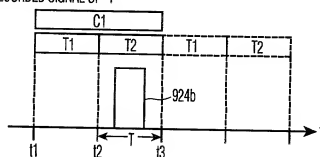


FIG. 26C

(4) TRIMMING PATTERN OF "1"

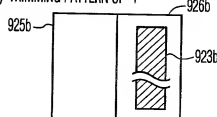


FIG. 26D

(4) RECORDED SIGNAL OF "010"

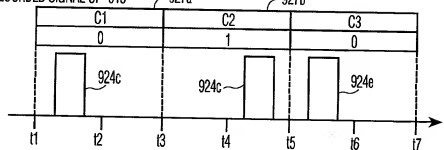


FIG. 26E

(1) TOP PLAN VIEW

FIG. 27A

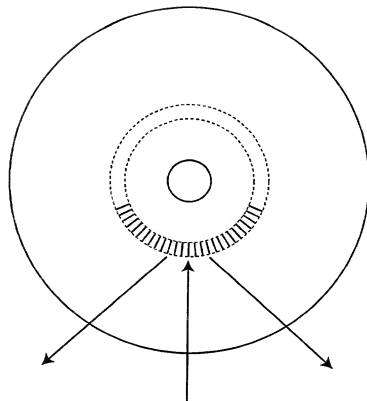
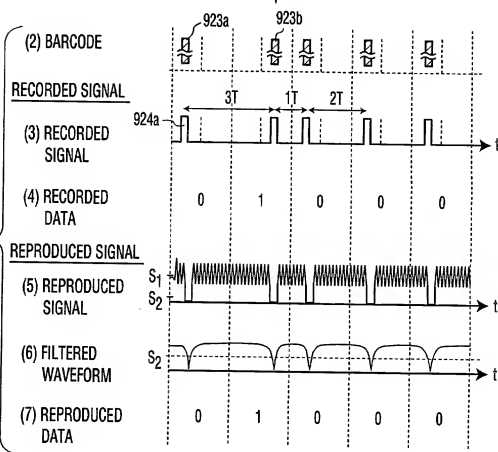
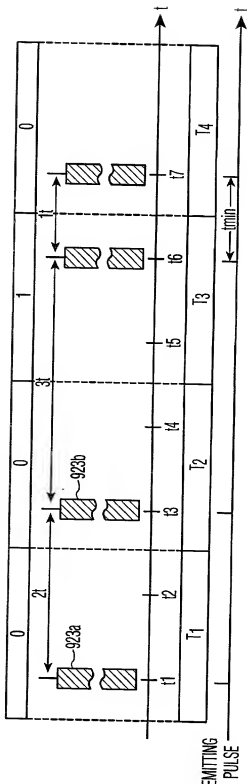
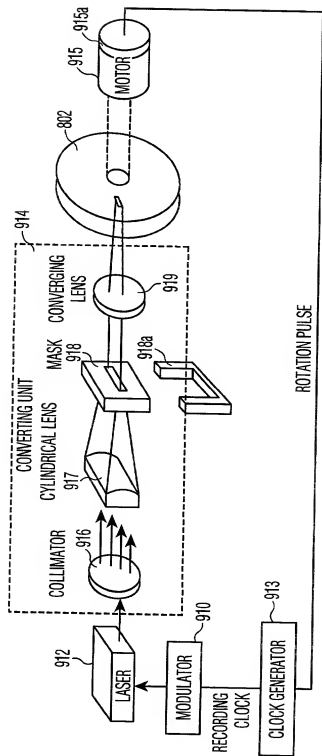
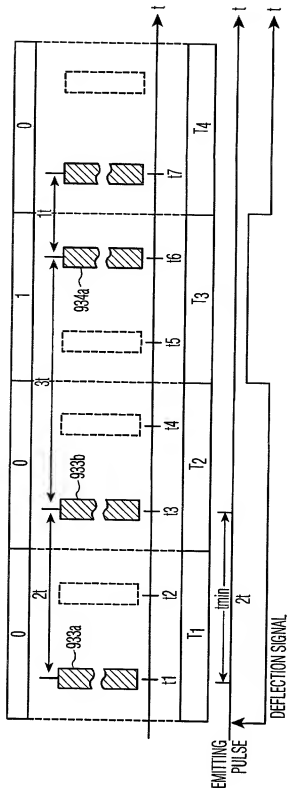
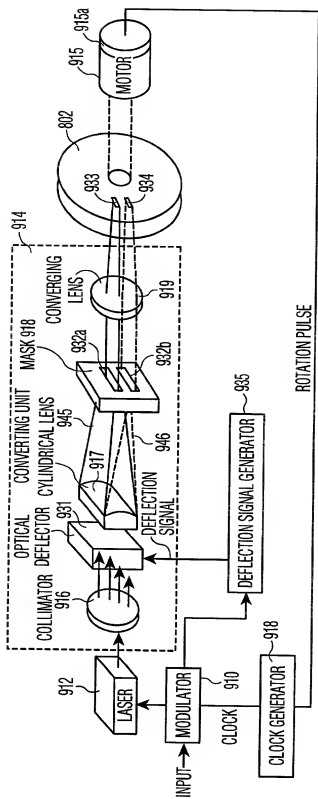
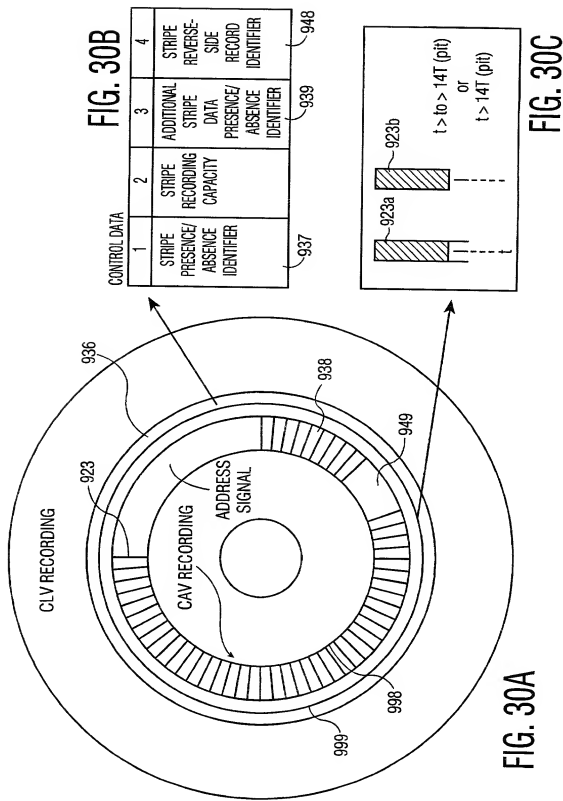


FIG. 27B









34/51

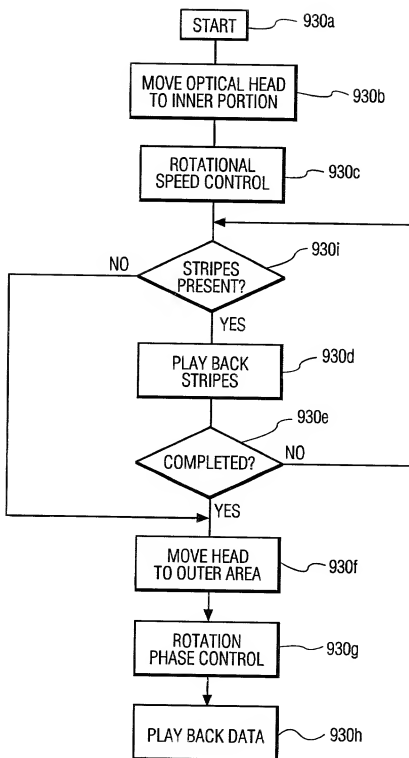


FIG. 31

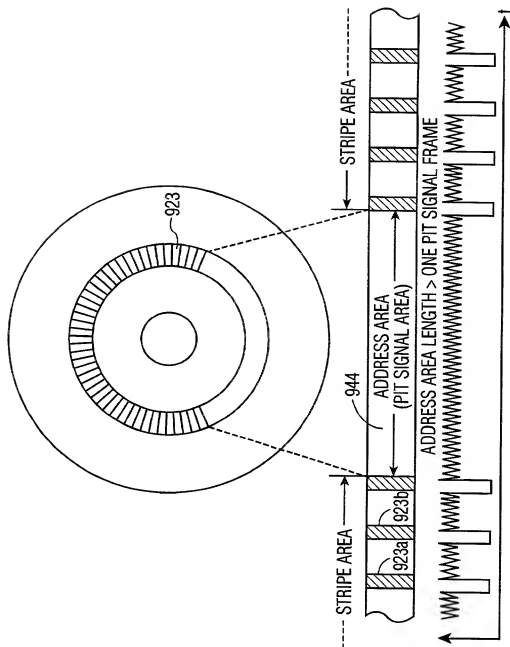


FIG. 32

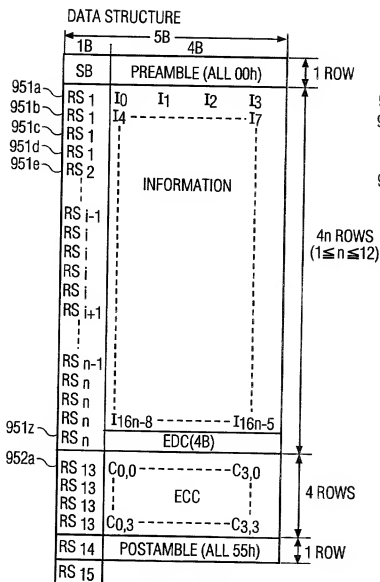


FIG. 33A

DATA STRUCTURE WHEN n=1

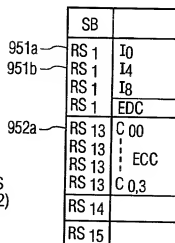


FIG. 33B

RANDOM ERROR CORRECTION CAPABILITY

BIT ERROR RATE BEFORE CORRECTION	READ ERROR RATE AFTER CORRECTION
10 ⁻⁵	1 IN 10 ¹⁰ DISKS
10 ⁻⁴	1 IN 10 ⁷ DISKS
10 ⁻³	1 IN 10 ⁴ DISKS
BURST ERROR CORRECTION CAPABILITY	

FIG. 33C

SYNCHRONIZATION CODE DATA

SYNCHRONIZATION CODE

SYNC BYTE /RESYNC	BIT PATTERN											
	FIXED PATTERN (CHANNEL BIT)								SYNC CODE (DATA BIT)			
	C ₁₅	C ₁₄	C ₁₃	C ₁₂	C ₁₁	C ₁₀	C ₉	C ₈	b ₃	b ₂	b ₁	b ₀
SB	0	1	0	0	0	1	1	0	0	0	0	0
RS ₁	0	1	0	0	0	1	1	0	0	0	0	1
RS ₂	0	1	0	0	0	1	1	0	0	0	1	0
⋮					⋮					⋮		
RS _i	0	1	0	0	0	1	1	0				
⋮					⋮					⋮		
RS ₁₅	0	1	0	0	0	1	1	0	1	1	1	1

FIG. 34A

FIXED SYNCHRONIZATION PATTERN

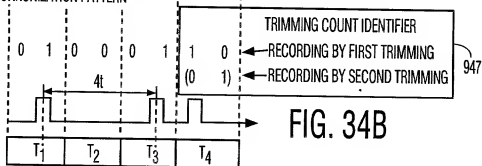


FIG. 34B

MAXIMUM CAPACITY

	RECORDING CAPACITY	TOTAL BYTE COUNT	EFFICIENCY	RECORDING AREA ANGLE	UNRECORDED AREA ANGLE
MINIMUM	12B	41B	29.3%	51 DEGREES	309 DEGREES
MAXIMUM	188B	271B	69.4%	336 DEGREES	24 DEGREES

FIG. 34C

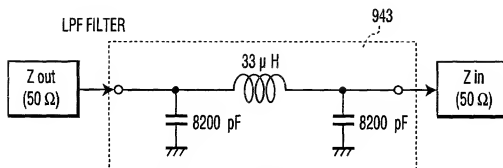
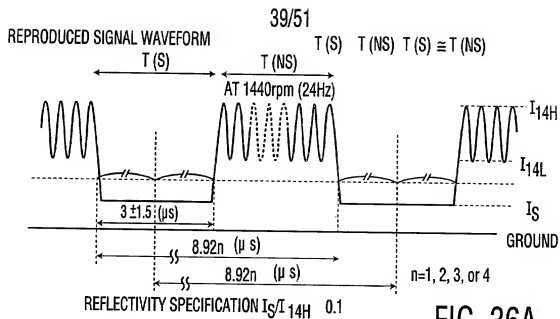


FIG. 35A

SIMULATOR WAVEFORM AFTER LPF : $I_{14L} = I_S = 0.1$



FIG. 35B



(1) TIME SLOT

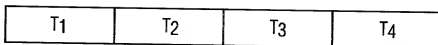


FIG. 37A

(2) CHANNEL BIT

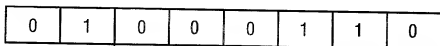


FIG. 37B

(3) RECORDING PULSE

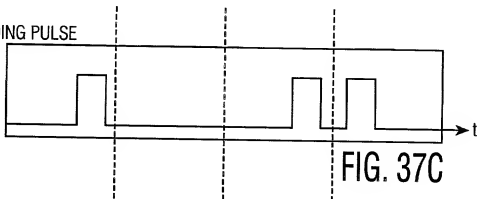


FIG. 37C

(4) EMITTING PULSE

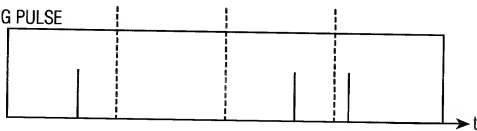


FIG. 37D

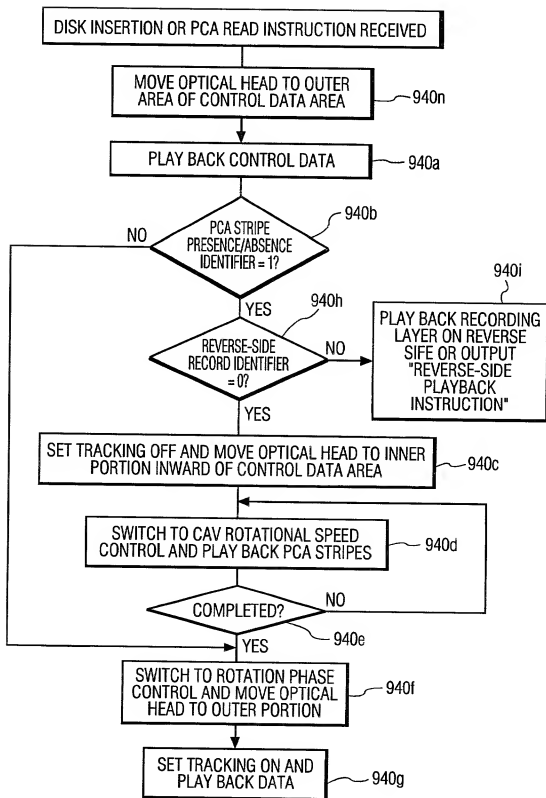


FIG. 38

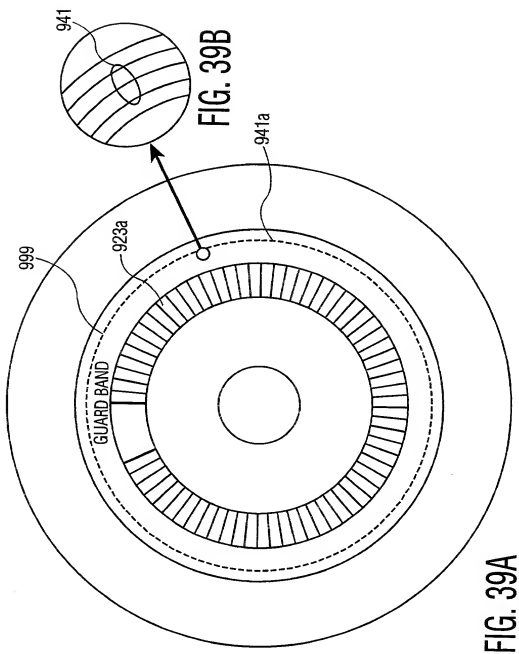
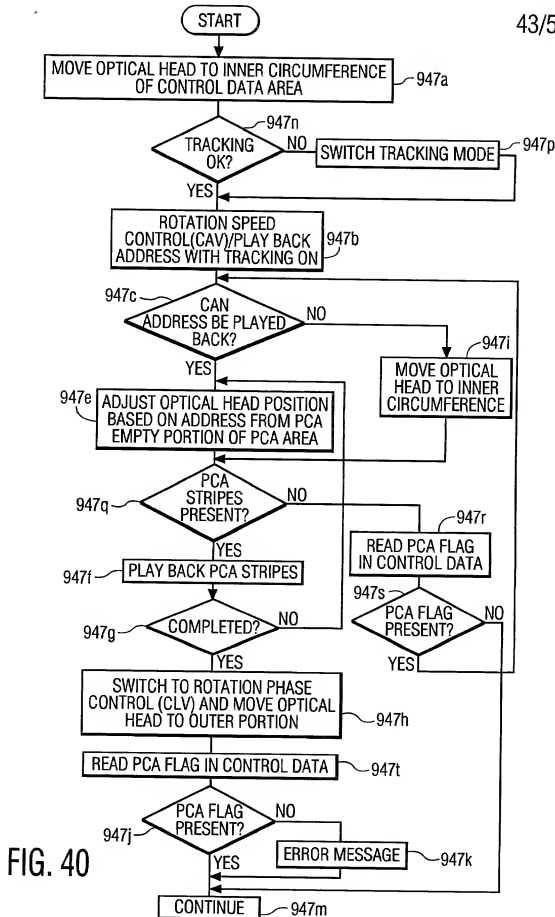


FIG. 39A



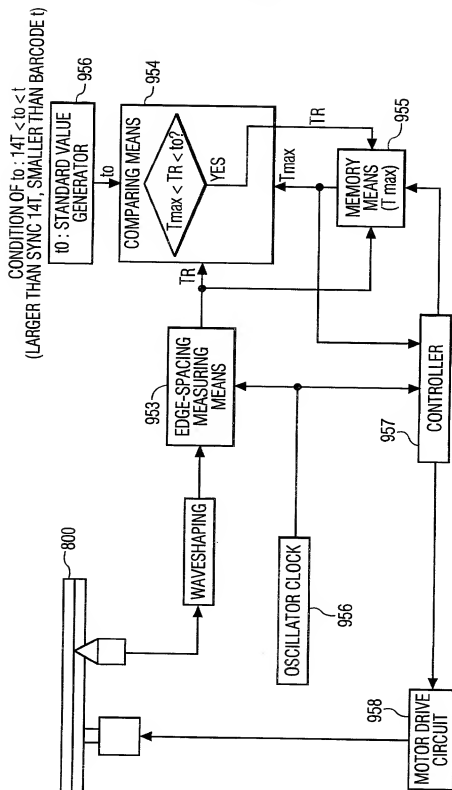


FIG. 41

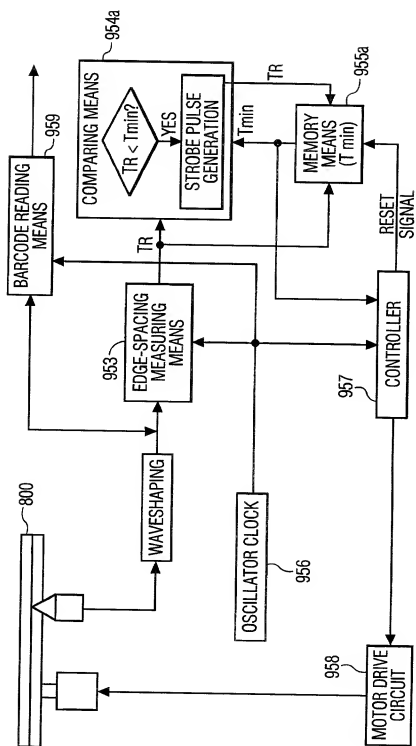


FIG. 42

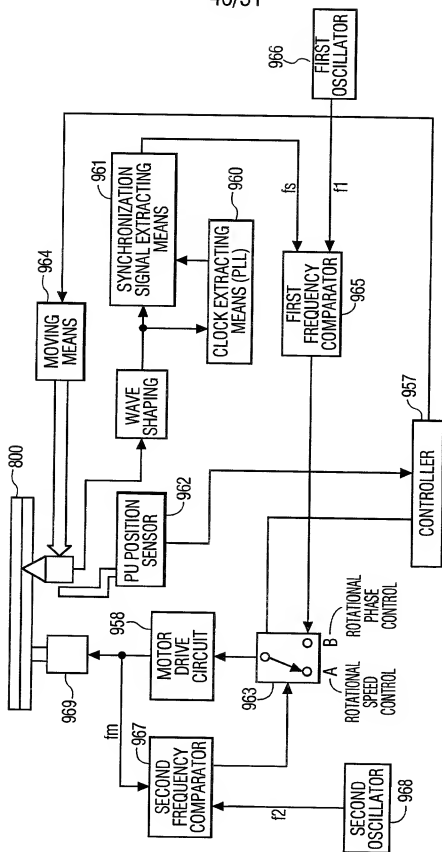


FIG. 43

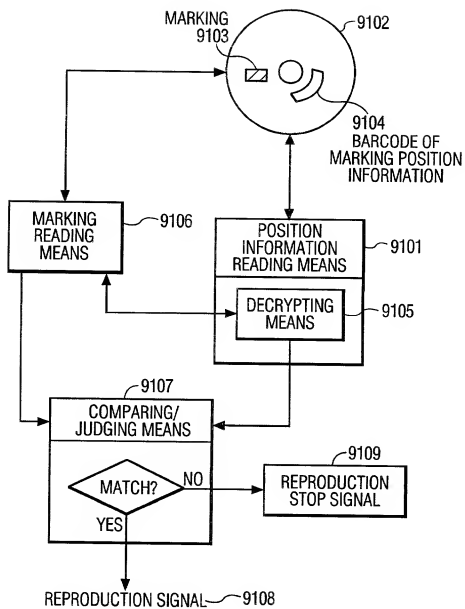


FIG. 44

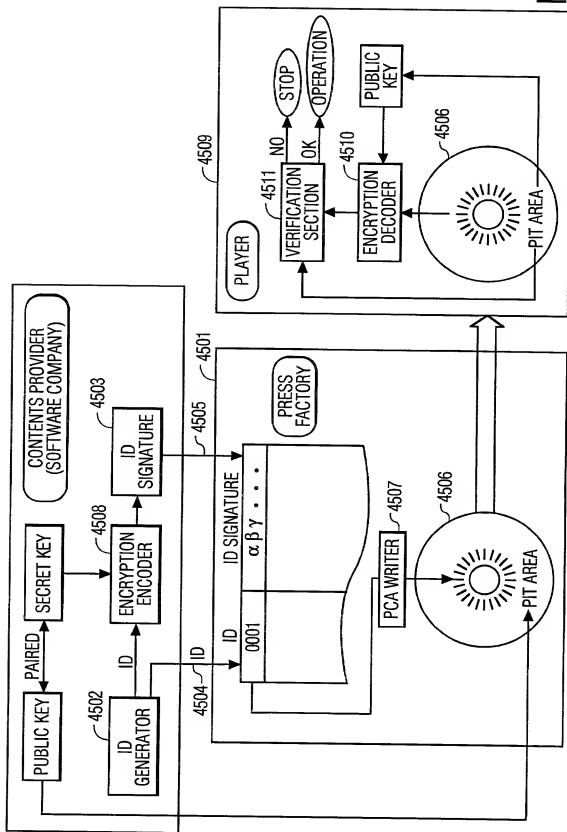
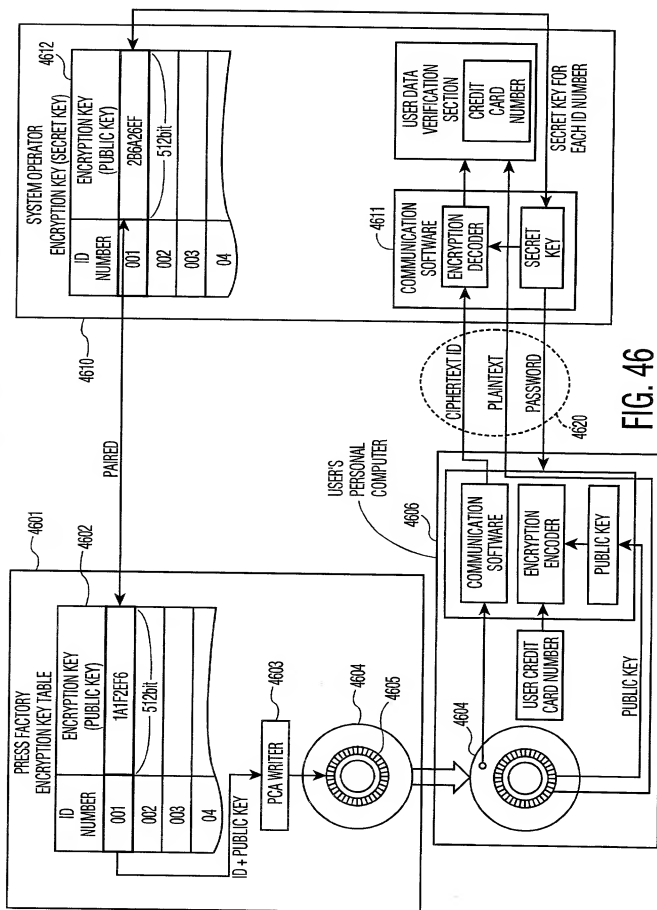


FIG. 45



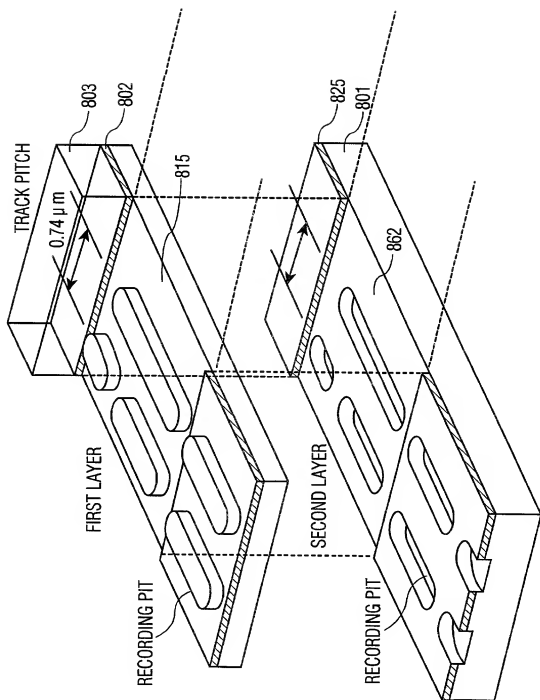


FIG. 47

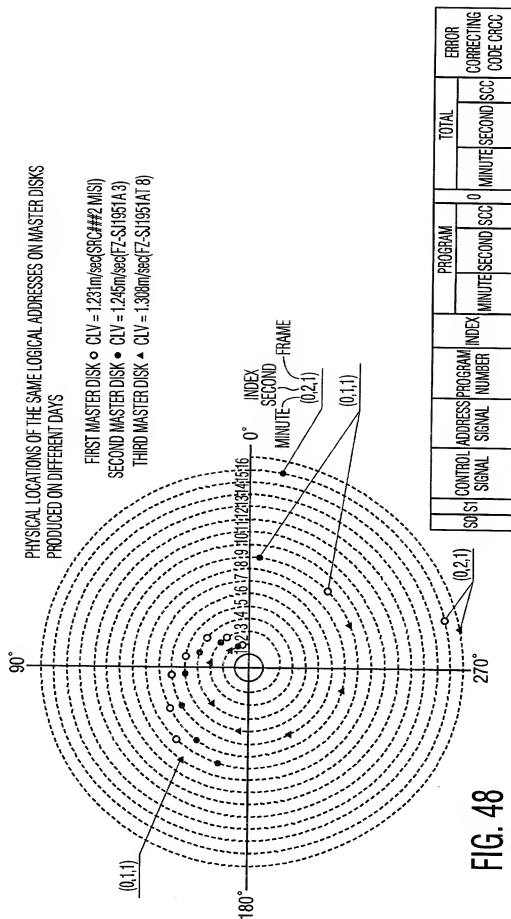


FIG. 48